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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/562,697	12/30/2005	Joni Hietala	43289-226597	3874

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EXAMINER	
SEDIGHIAN, REZA	
ART UNIT	PAPER NUMBER
2613	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/562,697	HIETALA ET AL.	
	Examiner	Art Unit	
	M. R. Sedighian	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 December 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *14-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *14-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 December 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *12/30/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

1. This communication is responsive to applicant's 12/30/05 preliminary amendments. The amendments have been entered. Claims 14-27 are now pending.

2. In claim 16, the phrase "is designed", in line 1, should be deleted.

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 14-16, 18-21, and 23-26 are rejected under 35 U.S.C. 102(b) as being anticipated by Kikuchi Hideo et al. (Patent Abstract of Japan, 2000-352634).

Regarding claim 14, Kikuchi Hideo teaches a method for transmitting signals in a circuit board (optical module 11A, fig. 1), the method comprising: forming at least one optical channel (optical fiber channel 12) to which an optical signal is input by means of an optical transmitter (optical element 16, fig. 1) and the optical signal input to the optical channel (optical fiber 12, fig. 1) is received with at least one optical receiver (optical element 15, fig. 1); designing the optical channel (optical fiber 12) in such a manner that at least two focal points are formed in it (see abstract, the two focal positions) and placing the optical transmitter (optical element 16, fig. 1) substantially in connection with one focal point (see abstract); and placing the optical receiver (optical element 15, fig. 1) substantially in connection with a second focal point (see abstract, the incident ports or exit ports of optical fiber 12 and the optical elements 15, 16 are respectively arranged in two focal positions of an ellipse).

Regarding claim 15, Kikuchi Hideo teaches designing the optical channel substantially in the form of an ellipse (see abstract and fig. 1).

Regarding claim 16, Kikuchi Hideo teaches designing the optical channel substantially in the form of two opposite parabolas (the optical channel formed by the two opposite parabolas, shown in figure 1), wherein the opening directions of the parabola forms are directed toward each other (the opening directions of the two parabola are directed toward each other, as it is shown in figure 1).

Regarding claim 18, Kikuchi Hideo teaches forming at least one mid-layer (26, 24, fig. 2) in the circuit board (substrate 14, fig. 2); and placing the optical channel (optical fiber 12, fig. 2) in the mid-layer of the circuit board (see abstract and 14, figs. 1, 2).

Regarding claim 19, Kikuchi Hideo teaches a circuit board (substrate 14, fig. 1), comprising: at least one optical channel (optical fiber 12, fig. 1) comprising at least two focal points (see abstract, the two focal positions); at least one optical transmitter (optical element 16, fig. 1) in an optical connection (19b, fig. 1) with the optical channel (optical fiber 12, fig. 1); and at least one optical receiver (optical element 15, fig. 1) in an optical connection (19a, fig. 1) with optical channel (the optical connection between the optical fiber and the optical receiver 15); wherein the optical transmitter is placed substantially in connection with one focal point (see abstract); and the optical receiver is placed substantially in connection with one other focal point (see abstract, the incident ports or exit ports of optical fiber 12 and the optical elements 15, 16 are respectively arranged in two focal positions of an ellipse).

Regarding claim 20, Kikuchi Hideo teaches the optical channel is substantially in the form of an ellipse (see abstract and 19a, 19b, 20, fig. 1).

Regarding claim 21, Kikuchi Hideo teaches the optical channel is substantially in the form of two opposite parabolas (the two opposite parabolas, shown in the figure 1), each parabola having an opening direction, and wherein the opening directions of the parabola forms are directed towards each other (the opening directions of the two parabola are directed toward each other, as it is shown in figure 1).

Regarding claim 23, Kikuchi Hideo teaches at least one mid-layer (26, 24, fig. 2) in the circuit board (14, fig. 2) comprising the optical channel (see abstract, the core layers 19a, 19b).

Regarding claim 24, Kikuchi Hideo teaches the optical transmitter (16, fig. 1) is a strongly diverging light emitting diode (the use of light emitting diode as light sources is well known).

Regarding claim 25, Kikuchi Hideo teaches the optical transmitter (16, fig. 1) is an RC-LED (the use of RC-LED as light source is well known).

Regarding claim 26, Kikuchi Hideo teaches the optical transmitter is placed in the optical channel at a location of the first focal point (see abstract); and wherein the optical receiver is placed in the optical channel at the location of the second focal point (see abstract).

5. Claims 14-27 are rejected under 35 U.S.C. 102(b) as being anticipated by Broockman et al. (US Patent No: 4,499,608).

Regarding claim 14, Broockman teaches a method for transmitting signals in a circuit board (col. 3, lines 3-12, 32-34 and 10, fig. 1), the method comprising: forming at least one optical channel (col. 3, lines 32-34 and 10, figs. 1, 2, 3, 5) to which an optical signal is input by means of an optical transmitter (col. 3, lines 34-40 and 54, fig. 5) and the optical signal input to the optical channel is received with at least one optical receiver (col. 3, lines 41-43 and 58, fig.

5); designing the optical channel in such a manner that at least two focal points are formed in it (col. 4, lines 1-20 and 50, figs. 3, 4), placing the optical transmitter (54, fig. 5) substantially in connection with one focal point (col. 4, lines 1-7, col. 5, lines 6-10); and placing the optical receiver (58, fig. 5) substantially in connection with a second focal point (col. 4, lines 11-21, col. 5, lines 10-12).

Regarding claim 15, Broockman teaches designing the optical channel substantially in the form of an ellipse (col. 4, lines 43-60).

Regarding claim 16, Broockman teaches designing the optical channel substantially in the form of two opposite parabolas (80, fig. 5 and figs. 7, 8, the parabolic contour 80 of reflector surfaces in either sides of the optical channel formed on the substrate 12, as it is shown in fig. 5), wherein the opening directions of the parabola forms are directed toward each other (col. 4, lines 67-68, col. 5, lines 1-12).

Regarding claim 17, Broockman teaches designing the optical channel by forming at least two ellipse (col. 4, lines 57-60 and 50, 40, 46, fig. 3, the two ellipse that can be formed on the optical chamber 10 and between reflector 42 and the reflectors 40 and 46, as it shown in fig. 3) in such a manner that each ellipse form one shared focal point (for example, focal point 50, fig. 3), wherein the second focal point of each ellipse form is separate from other focal points (the focal points of respective reflectors 40 and 46 are separate from each other and from the focal point 50).

Regarding claim 18, Broockman teaches forming at least one mid-layer in the circuit board (col. 3, lines 5-6, note that the circuit board 12 can be comprised of a mid-layer); and

placing the optical channel in the mid-layer of the circuit board (12, fig. 5, note that the optical channel can be formed in the mid-layer of circuit board 12, as it is shown in fig. 5).

Regarding claim 19, Broockman teaches a circuit board (12, 22, figs. 1, 5), comprising: at least one optical channel (the optical channel or the optical link that is formed between the elements of optical chamber 10, shown in figs. 2, 3, 5) comprising at least two focal points (col. 5, lines 8-9); at least one optical transmitter (54, fig. 5) in an optical connection with the optical channel (col. 3, lines 32-43); and at least one optical receiver (58, fig. 5) in an optical connection with optical channel (col. 3, lines 39-43); wherein the optical transmitter (54, fig. 5) is placed substantially in connection with one focal point (col. 5, lines 6-9); and the optical receiver (58, fig. 5) is placed substantially in connection with one other focal point (col. 5, lines 10-12).

Regarding claim 20, Broockman teaches the optical channel is substantially in the form of an ellipse (col. 2, lines 63-65, col. 4, lines 43-60 and fig. 7).

Regarding claim 21, Broockman teaches the optical channel is substantially in the form of two opposite parabolas (80, fig. 5 and figs. 7, 8, the parabolic contour 80 of reflector surfaces in either sides of the optical channel formed on the substrate 12 can form two opposite parabolas, as it is shown in fig. 5), each parabola having an opening direction, and wherein the opening directions of the parabola forms are directed towards each other (col. 4, lines 67-68, col. 5, lines 1-12, note that each parabolic contour 80 formed on either side of optical channel has an opening direction, which is directed toward the other end and to other contour).

Regarding claim 22, Broockman teaches the optical channel comprises at least two ellipse forms (col. 4, lines 57-60 and 50, 40, 46, fig. 3, the two ellipse that can be formed on the optical chamber 10 and between reflector 42 and the reflectors 40 and 46, as it shown in fig. 3) in such a

manner that each ellipse form has one shared focal point (for example, the shared focal point 50, fig. 3), wherein the second focal point of each ellipse form is separate from other focal points (the focal points of respective reflectors 40 and 46 are separate from each other and from the focal point 50).

Regarding claim 23, Broockman teaches at least one mid-layer in the circuit board comprising the optical channel (col. 3, lines 5-12, note that circuit boards or substrates can be comprised of mid-layers).

Regarding claim 24, Broockman teaches the optical transmitter is a strongly diverging light emitting diode (col. 3, lines 39-40).

Regarding claim 25, Broockman teaches the optical transmitter is an RC-LED (col. 3, lines 39-40, note that RC-LED light sources are well known).

Regarding claim 26, Broockman teaches the optical transmitter (54, fig. 5) is placed in the optical channel (the optical channel formed on the bottom wall or substrate 12, shown in fig. 5) at the location of the first focal point (col. 5, lines 6-8), and the optical receiver (58, fig. 5) is placed in the optical channel at the location of the second focal point (col. 5, lines 10-12).

Regarding claim 27, Broockman teaches the optical transmitter (54, fig. 5) is placed on the surface of the circuit board (note that optical emitter 54 is placed on the surface of substrate 22, shown in fig. 5) at the location of the first focal point (col. 5, lines 6-9), and wherein the optical channel comprises: a first beam inverter in the first local point to invert the signals directed from the optical transmitter (54, fig. 5) to the first focal point substantially to the direction of the main level of the optical channel (col. 4, lines 67-68, col. 5, lines 1-3); and a second beam inverter (56, fig. 5) in the second focal point to invert the signals coming from the optical channel to the

second focal point towards the optical receiver (col. 5, lines 2-5); wherein the optical receiver (58, fig. 5) is placed on the surface of the circuit board (22, fig. 5) at the location of the second focal point (col. 5, lines 10-12).

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. R. Sedighian whose telephone number is (571) 272-3034. The examiner can normally be reached on 9 to 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. R. Sedighian/

Primary Examiner, Art Unit 2613